



Editorial

Science—Policy Engagement to Achieve “Water for Society—Including All”

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After more than three years of implementing the 2030 Agenda for Sustainable Development, the 2019 World Water Week in Stockholm chose to focus on inclusiveness with the theme “Water for society—Including all”. This is also the theme of this Special Issue, which brings together the scientific highlights presented during the week. As connector across the SDG agenda, water has a critically important role in reducing poverty and hunger and driving sustainable development, building peaceful and prosperous societies, and ensuring that ‘no one is left behind’ on the road towards sustainable development. The United Nations World Water Development Report 2019 concluded that these goals are entirely achievable, provided exclusion and inequality are addressed in both policy and practice, but this needs new science, and capacity to ensure implementation, bridging the science–policy gap [1].

Topics addressed during the 2019 World Water Week and in this Special Issue include, but are not limited to, acute water scarcity for individuals and societies, water justice, lack of access to safe water supply and sanitation, food and energy insecurity, exposure to catastrophic weather extremes, and pathways to secure inclusive and resilient development. Inequality of access to and the benefits of water security can be found in all parts of society from the household and local community level, to landscape and global settings. Evidence shows that often the people who are furthest behind—e.g., people who experience discrimination because of age, gender, socio-economic status, impairments, membership of ethnic, religious or linguistic minorities, etc.—are those least able to access the benefits of water security, least able to have a voice and say in water security decisions, and ultimately least able to progress towards enjoying all their human rights including the human rights to water and sanitation.

A main issue for water for all is to address water needs and benefits for humans, especially, women and youth. Women and youth are indeed most affected by lack of access to safe water and sanitation. They are often under-represented in participation in decision-making processes related to water issues at all levels. The field of water gender inequalities determines how women and men are affected differently and how resources are developed and managed. The Sustainable Development Goal (SDG) 5 clearly states this issue, putting at its core the goal of achieving gender equality and empowering all women and girls. Young people also face significant challenges of a lack of recognition or voice at the table, which inhibit their potentially large and innovative contributions to water solutions for all. Women and youth empowerment processes as well as direct access to finance are necessary for action directed towards achieving the SDGs in an inclusive manner. Human rights-based and gender-responsive-based interventions that reduce inequalities and increase



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access to water and sanitation have the potential to dramatically improve the lives and livelihoods of youth and women worldwide and to ensure that no one is left behind. Grant et al. [2] examined the extent to which women's ownership and management of water supply schemes led to their empowerment, including their economic empowerment, in rural Cambodia. Lyon et al. [3] highlighted the need to establish a new standard of higher education promoting exchange between countries, as local populations are vulnerable to future shifts in climate at global scales and changes in land usage at regional scales. The new standard should include peer-to-peer mentoring achieved by jointly exchanging and training students and practitioners in water management techniques, increasing access to water data and pedagogic information across the region, and lowering administration roadblocks that prevent student exchange.

The second theme questions how water governance with and for all is working, in line with SDG 6.5: "by 2030, implement Integrated Water Resources Management (IWRM) at all levels". Water governance refers to the political, institutional, social, economic and administrative systems in place that influence water's use and management. The design and development of water governance arrangements is grounded in the conceptual understanding of cultural, economic, moral, religious and ethical dimensions of allocations. Good multi-level water governance is a prerequisite for leaving no one behind. There is a link between poverty and access to water services and adaptation and mitigation of water-related risks, including for sanitation and productive water uses. However, attempts to clarify rules and roles should not complicate water governance but rather clarify and streamline links and nexuses. Enhanced access to water is one of the conditions to eliminate poverty with defined mechanisms of delivery to the poor. Pricing arrangements are rarely equitable and financing arrangements often discourage service provision. There is a need to enhance and appropriately balance equity, efficiency and enforceability in water governance arrangements. Jimenez et al. [4] reviewed the concept of water governance and the term's use to reveal how the concept is understood, referred to and implemented in practice by different stakeholders. Schreiner and Van Koppen [5] aimed to, first, further understand the implications of permit systems for both the most vulnerable and the state, and, second, identify options for pro-poor water legislation that also meet the water governance requirements of the state. Richards [6], using qualitative data, discusses Tanzanian Water Users Associations (WUAs) in light of the Regulatory Framework within which they operate. She argues that although the government's objectives are to achieve an equitable and sustainable allocation of water resources, the formalisation of water allocation has led to the exclusion of specific water users. Inha et al. [7] argued that institutional diversity and player/stakeholder collaboration are the foundation for enhancing good multi-level water governance, and that water management, although fragmented, should be seen as a connector of different sectors. For successful outcomes, scientific results should be communicated to the public in more common language.

The third theme considers inclusiveness by looking at sanitation for society, including all of society, which is at the core of SDG 6: "Ensure availability and sustainable management of water and sanitation for all" and more specifically of SDG 6.2 target: "by 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations". At an individual level, both the SDG target and the human right to sanitation imply that everyone must have access to sanitation which is safe, private, dignified, hygienic and affordable. At a societal level, improved sanitation is a public good that generates economic, health, environmental, social and cultural benefits for society as a whole. There is a huge task ahead to ensure full sanitation coverage, safe management of excreta, and availability of handwashing facilities with soap and water in schools and health care facilities, in accordance with the human right and the SDG target. All this must be done in both urban and rural settings, with their different sanitation problems and solutions. During the era of the MDGs, the poor, children, elderly and ethnic minorities were the most neglected in sanitation service provision; now, the concept of

inclusiveness requires that they and any other disadvantaged groups be served in ways that protect health and dignity. Tomkins et al. [8] explored the experiences of partners in the multi-national, EU-funded INNOQUA project, who have developed and are currently demonstrating the potential for novel nature-based, decentralised wastewater treatment solutions in 10 different countries. People's voices matter—in planning and delivery, people should be at the centre of decision-making about their sanitation services, holding the providers accountable. Often the most appropriate and sustainable solutions can be found locally, through people's innovations and partnerships. Inclusive sanitation makes economic sense. Excluding people within service areas is inefficient economically as well as morally and socially. The cost of raising access for the excluded are small compared to the huge benefits it brings for health and economy.

The fourth theme considers inclusiveness by addressing the role of finance for the transformation of societies to meet the SDGs. Far-reaching societal transformations are required to achieve the Sustainable Development Goals (SDGs), and finance for water plays a vital role in under-pinning these transformation processes. According to estimates by the World Bank, investments need to triple to reach the water-related SDGs, and traditional approaches will not get us there. Without a substantially deeper understanding of the different funding and financing options by water professionals, the sector will not be able to mobilise and scale up finance to achieve its goals. Without a proper enabling environment, financial flows will continue to leave the WASH sector under-financed. Transforming business-as-usual by revaluing water is needed to improve social equity and distribution (e.g., women and youth), whilst at the same time increasing economic growth and protecting water-related ecosystems. Noteworthy, the High-Level Panel on Water identified the need for more clarity on allocating, valuing, pricing and trading water, and the transparent incorporation of these values into decision-making. Institutional, regulatory and policy changes are required to enable the implementation of financial inclusion mechanisms in order to maximise social equity. Identifying shared responsibilities, co-benefits and win-win situations are important components in the process.

The fifth theme addresses migration through regional integration and water security for all. Regional economic integration can foster transboundary water management as well as energy and food security. It also attracts investments that address infrastructure deficits, accelerates participation in global and regional value chains, and stimulates economic growth. All are important entry points for sustainable development. However, environmental and social co-benefits are typically not as well quantified as economic growth, and the nuanced relationships between migration, water (in)security and regional integration are often oversimplified. Inclusive development, if undertaken correctly, can potentially support all dimensions of sustainability, including coping with rising pressure on resources and population increases experienced in Africa and Asia. The latter pressures, coupled with the potential for economic failures, increases the number of people seeking a better life, with international migration reshaping the socio-political, environmental and economic landscapes of 'departing' and 'receiving' countries. Departing countries shed skills and social cohesion, while recipients face increased competition for resources, jobs and social structures. Krakow [9] explored international law regarding the human right to water as it impacts people who are stateless, displaced and/or residents of armed conflict zones in the contemporary Middle East. Hussein et al. [10] analysed how narratives of water crises and refugees in Lebanon and Jordan are influencing water governance debates.

The sixth theme is equity in climate change adaptation, which builds on SDG 13, which states to "take urgent action to combat climate change and its impacts". Impacts from climate change pose many challenges to water and sanitation development and management. This includes changing patterns of both supply and demand for water resources, affecting the functions and operations of existing water and sanitation infrastructure, increasing the frequency of extreme weather events and changing ecosystems and their functions. Addressing ecosystem health requires a systematic view from source to sea that considers people and nature, both rural and urban. They also alter human migration

patterns. Evidence shows that the poor and ethnic minorities are more vulnerable because they can be highly exposed to climate extremes and because their adaptive capacity is often lower. If poorly undertaken, adaptation processes can potentially exacerbate inequalities, causing maladaptation. Undue burden is often placed on women and youth, although these groups also play a key role in achieving successful adaptation. Equitable adaptive capacity building requires addressing not only climate-related risks but also socio-economic structural deficits. Vulnerable people and communities are more than just data points. We must recognise the agency and power they have in driving effective and inclusive adaptation. Successful adaptation must, therefore, address dilemmas of equality, many of which are most acute in vulnerable communities across the world. Glas et al. [11] developed a flexible, low-cost methodology—a toolbox for mapping flood hazard, vulnerability and risk. A generic methodology was developed and customised for freely available data with global coverage, enabling risk assessment worldwide. Aheeyar et al. [12] synthesised findings from selected case study areas and from a review of the literature on other weather index insurance (WII) initiatives into a framework to promote a systematic approach to address these challenges: an important step forward in moving from problem analysis to remedial action. King-Okumu et al. [13] found that members of the most vulnerable communities can integrate available methods to assess drought risks to their land and ecosystem productivity, their livelihoods and their life-supporting hydrological systems.

The seventh theme investigated how entrepreneurship drives water impact for all. Global business leaders have been identifying “Water Crises” as a top 5 risk to their businesses in terms of global impact and likelihood, indicating a realisation that unsustainable water use in developing, emerging and industrialised countries alike can negatively affect water availability and quality for all users, including businesses. However, business could be part of the solution. Public and private actors are coming together more often to discuss how to reduce or eliminate risks to public and eco-system health, and incremental losses for businesses. The role of policy-makers and international development agencies have been continuously moving towards catalysing private actors, funds and small- and medium-sized businesses (SMEs) to contribute more fundamentally to sustainable development through promoting impact-driven and inclusive solutions. To achieve an equitable water sharing for all society sectors and for healthy ecosystems, an entrepreneurial sector could be empowered to create inclusive, community-based solutions. It is important to convene all actors in the entrepreneurship ecosystem to maximise efficiencies across WASH value chains. Drawing from the latest research on effective public financial management and based on evidence from the countries where these organisations work, Pories et al. [14] demonstrated that sustainable success in mobilising finance on a large scale is dependent on a reasonable level of performance across 10 foundational areas.

The contributions and cases presented in this special issue show a rich emergence on the issue of water security for all, and the critical factor of inclusiveness and voice, to accelerate achieving the Agenda 2030. The inclusiveness and voice in design, management and implementation, can make a difference for achieving outcomes successfully, especially for the most vulnerable. Yet, in 2020, several challenges loom, with increasingly complex global challenges to achieve progress for all concerning water security. Food and nutrition security, poverty and progress on health and sanitation show negative trends including on multiple water related SDG targets. Re-direction of funding due to COVID-19 emergencies and necessary economic stimuli packages, and scenarios of additional pressures due to climate change add to the burden on achieving water security for all. These issues will be addressed in World Water Week 2021 with the overall theme “building resilience faster”. New knowledge needs to be generated continuously and be shared to accelerate progress in an increasingly complex and uncertain future to achieve inclusiveness in global and local water security.

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